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# New Zealand Marine Studies Centre

Annual Report

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The New Zealand Marine Studies Centre (NZMSC) provides a window into marine research at the University of Otago and fosters an understanding of New Zealand's marine environment and its conservation through community engagement and education.

# Marine science for southern New Zealand schools

The New Zealand Marine Studies Centre (NZMSC) education programmes engage primary and secondary school classes across southern New Zealand in science learning through field trips to local marine habitats, boat journeys and practical sessions in our specialist marine science teaching laboratory. Access to seawater aquaria, live marine species, and a range of scientific equipment and expertise create learning opportunities not available in a classroom. Students develop science skills and an understanding of marine issues, learn about science careers, participate in and contribute to scientific research, and engage in environmental action and stewardship (kaitiakitanga).

Our programmes link to The New Zealand Curriculum and focus on the Nature of Science strand, support achievement for a diversity of students, including Māori and Pasifika, and are tailored to meet specific learning outcomes. Multi-day programmes provide students with opportunities to challenge their science ideas, develop skills in instrument use and experimental design, and work together with science mentors to answer real-world questions.

These programmes are partially supported through a Ministry of Education Learning Experiences Outside the Classroom contract (2018–21).



## Dunedin programme

Students travel from all over Otago, Southland, South Canterbury and South Westland to participate in our curriculum-linked marine science programmes delivered at the New Zealand Marine Studies Centre (NZMSC) and Portobello Marine Laboratory on the shores of Otago Harbour. As part of the Marine Science Department, University of Otago, students get a unique and immersive experience in the world of marine science.



## Nelson outreach programme

With an educator based in Nelson, the NZMSCs programmes extend to Nelson, Marlborough, Tasman, North Canterbury and West Coast schools. The programmes are delivered through a range of coastal sites, school camp venues and other science institutions (including Cawthron and the Nelson Marlborough Institute of Technology), and Steadfast Sail Charter.

A new programme introduced in 2021 links the Kaipupu Wildlife Sanctuary near Picton with a trip on Steadfast Sail to get an overview of the land and sea environments in the Marlborough Sounds. Port Marlborough provides support for local schools to take part in the day-long “Turf-to-Surf” programme.



## Teacher feedback

100% of teachers said that the programme increased their students' understanding of the Nature of Science. Comments from secondary teachers included:

“ Unique opportunity for authentic scientific investigation with uninterrupted time to be able to complete the work. Expert and experienced staff who encouraged students to problem solve to find solutions. Students could make links between biology and statistical analysis. ”

“ In completing ‘real science’ independently, they really have to think about how scientists work and why they do things in certain ways. ”

“ Having the ability to have a hands-on approach and to use specialised equipment, and also to have ‘real’ scientists helping is invaluable. ”

At primary level, 100% of teachers said that the programme allowed student learning to be extended beyond what was possible in the classroom.

“ Students were able to have a new experience and show bravery and resilience. Opportunity for different students to shine. ”

“ Students loved that the testing didn't work out as expected. This showed them that science is a process and it takes more than one experiment to get thorough results. ”

Teachers also highlighted aspects of the programme that were beneficial to their own learning:

“ Being exposed to practical aspects of science and the logistical concerns of carrying out practical work was enlightening. It is something I will incorporate into my own teaching in a classroom lab setting. ”

“ Access to current researchers and research. Networking opportunities for future education activities. ”

In **2021**, the **NZMSC** programme **engaged** more than **18,452** people, despite the **COVID-19** restrictions. The participants included:

**5,508** school students and teachers from the lower South Island who attended curriculum-linked programmes through the Centre.

**6,224** school students, teachers and communities that participated in the Aquavan programme

**2,598** interest groups and families that participated in marine experiences

**4,122** school students and teachers who attended outreach programmes in the Nelson/Marlborough/Tasman region.

## Tertiary student recruitment.

**20%** of MARI112 students from NZ (and 42% from the South Island) had participated in NZMSC secondary programmes

**37%** of MARI112 students from NZ (and 79% from the South Island) had participated in NZMSC primary programmes, visited the Aquarium or used resources produced by the NZMSC.



# Science extension and enrichment

More than 186 students (19% Māori, 16% Pacific) from schools around the South Island participated in ten multiday and residential programmes (4–8 days in length) with two designed for Māori Students and two designed specifically for Pacific students. These research-based programmes incorporate leadership and creativity to provide able and enthusiastic students with an in-depth experience and understanding of the marine world. These programmes are partially supported through a Ministry of Education Opportunities for Gifted Learners contract (2019-2023).



- Science and the Sea – for Year 6–8 students (4-day programme)
- Making Sense of the Marine World – for Year 10 students (8-day residential programme)
- Deep Thought Expedition – for Year 11 and 12 students (5-day residential programme, based on the RV Polaris II)

“ I would highly recommend because of the quality learning experiences and opportunity for in-depth study with expert mentors. The friendships formed and opportunities to work with others. ”

“ The students came back raving about it ... a huge boost of confidence for all three students who have come back to school raring to go, and so enthusiastic. ”

“ Teaches scientific investigation and communication skills through working with real-life situations. Additionally, students get to work with scientists and to develop their ability to select, design and evaluate scientific projects. There is a lot of student agency going on here. Empowering. ”

## Opportunities for Māori students

Two multiday programmes provide an in-depth experience and understanding of the marine world, focusing on Māori values. The students work together to build knowledge, develop skills and extend understanding.

- Te Rauawa o Te Pahī – for Year 9 and 10 students (4-day residential programme)
- Rangitahi o Te Moana – for Year 11 and 12 students (5-days residential programme, based on RV Polaris II)

“ Amazing opportunity, promoted [my child's] independence and thinking. He was keen to go to university before, now he's excited and happy about it, and can't wait to get there. ”

*(Rangitahi o Te Moana parent)*

“ The programme was so helpful in many aspects. When I first arrived I didn't really want to be there and wasn't open to having to make new friends, but now I've become closer with people from my school and made some great friends from other schools. This programme pushed me so much with science and the way we structured everything. I honestly learnt so much and the people were amazing. I enjoyed every bit of it and getting to learn more about Māori culture as well. I highly recommend this programme and have been convincing others from my school to do it next year. ”

*(Rangitahi o Te Moana parent)*



## Opportunities for Pacific students

Two multiday programmes provide marine science learning opportunities framed by Pacific values. A highlight was the Moana Explorers programme for Year 9 and 10 students, exploring the importance of narratives and storytelling and delivered in collaboration with Science Communication.

- Mapu kimi-ara Pasifika – for Year 6-8 students (4-day programme)
- Moana Explorers – For Year 9 and 10 students (3-day programme)

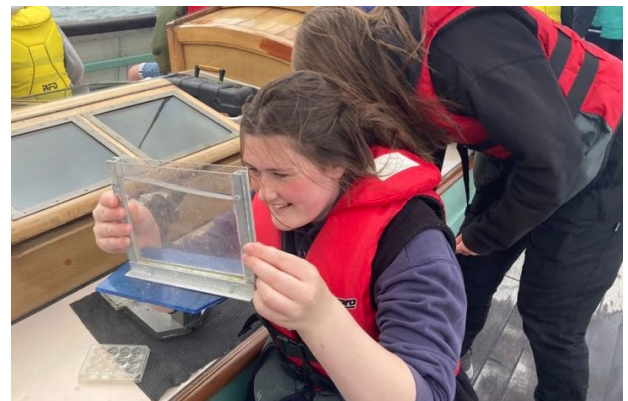
“I would definitely recommend this learning programme to other Pasifika kids. Both my children attended and enjoyed meeting new people as well as learning about their marine environment. The mentors were very positive and encouraging, keep the programme interesting and varied. It has helped stimulate my kids into thinking about careers in science.”

*(Mapu kimi-ara Pasifika parent)*

## Nelson Aquanauts Programme

Getting to the moon is hard. Getting to the bottom of the ocean can be harder! 20 students from the Nelson/Marlborough region were selected to participate in an inaugural 5-day programme “Aquanauts: Spying on the Depths” at Mistletoe Bay in the Marlborough Sounds, a collaboration between the NZMSC and Ministry of Inspiration. The Year 9 and 10 students were challenged with building Aquabots to sample the ocean floor; they quickly realised issues scientists face working in this problematic environment. Water pressure, salt and electronics in the sea, as well as water currents and wildlife all presented challenges.

Some of the highlights for students included “making and testing the aquabots”, “working in teams, with likeminded people”, “conducting enquiries and physical experiments in the outdoor environment” and “working with marine scientists to collect data”. Most students (90%) said doing field work and being challenged enriched and extended their learning.



## Marine Conservation

Eugene Sage (Member of Parliament, Green Party) was captivated by the marine biodiversity during her visit to the NZMSC and the Department of Marine Science in May. She went behind the scenes of current climate change research, met some amazing local marine life and expressed her support for the innovative research being led by the Marine Science Department. She expressed enthusiastic support for the education programmes run by the NZMSC and acknowledge their role and importance in marine conservation.





# Aquavan travelling programme

The Aquavan, equipped with chilled re-circulating seawater tanks and a mobile touch tank, transports marine life to classrooms, community halls and showgrounds. Through fun, hands-on workshops, all ages engage in learning more about local marine species and their importance in the ocean food web, as kai moana and as indicators of change.

## Discovering our Coastal Connections

Travelling from sea to source, the Aquavan Catchments Programme highlights connectivity between river health and the coastal environment. Using live marine species, a 3-D catchment-model, science equipment, hands-on investigations and field studies, it demonstrates how upstream activities affect the coastal environment, and encourages local ownership and improved management.

In 2021, the Aquavan visited schools and communities in Southland and Otago thanks to funding from Thriving Southland and the Dunedin City Council Te Ao Tūroa grant. These trips involved 14 schools and six teacher workshops (2,143 students, 188 teachers).

100% of teachers thought the programme enabled them to extend student learning beyond what was possible in the classroom and students developed an understanding of their connections to the coast. .

- “ The props and back and forth nature allowed students with learning needs to have a wholesome experience of the concept, and the opportunity to clarify.. ”
- “ Current topics linked with real life. Linked our key competencies. Students could relate due to farming backgrounds. ”
- “ The hands-on activities made it more real and emotive. I love how each station was brought back to thenarrative. ”



## Community Learning

The Aquavan participated in 15 community events (4,013 public visitors) this year thanks to support from Catchments Otago, Thriving Southland and the University of Otago. These events provided further opportunities for urban communities to develop coastal knowledge and skills for environmental action and to support community building and networking. Linking community days with school programmes encouraged students to share their knowledge with friends and whānau/ family.

Highlights included the Moana Nui festival at the stadium, the University of Otago picnic and the Sea Monsters exhibition at the Otago Museum. The Aquavan also brought the ocean to libraries around Dunedin during the International Science Festival! From sea cucumbers to camouflage crabs, library visitors were able to come face-to-face with local biodiversity and learn about the ocean through activities and games.





# Educational resources

NZMSC's resources guide teachers to use the local coastal environment to teach science in the classroom and support families and communities to explore the local seashore.

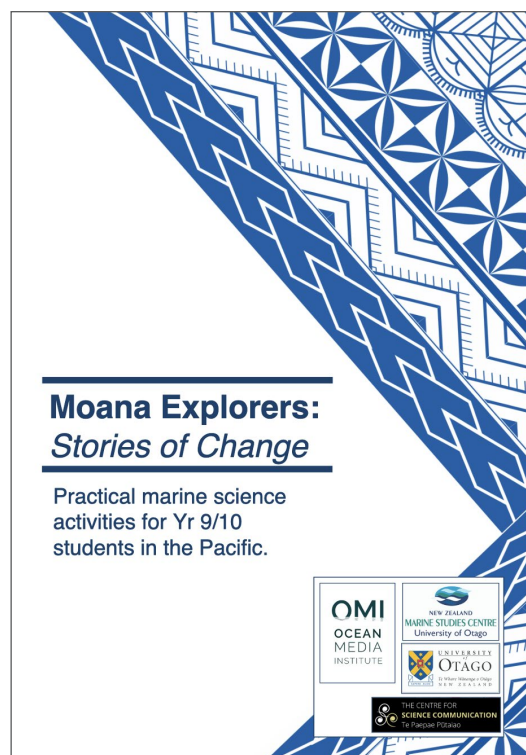
## Te Moana Ora/The Healthy Ocean

A new collection of resources on the NZMSC website support schools and communities to take part in monitoring, researching and discovering more about our coastal ecosystems, with a Mātauranga Māori focus. Explore the seashore using our te reo Māori shore guides, or learn about kaitiakitangi and fishing techniques in the Hōia te Waka activity series.

Supported by the Institute of Environmental Science and Research (ESR) Te Whare Manaaki Tanga, Taiao Hoki, <https://www.otago.ac.nz/marine-studies/resources/te-moana-ora/index.html>

## Moana Explorers: Stories of Change

Practical activities were designed for Year 9 and 10 students focused on climate change. These activities were developed to support science education for Pacific students in Aotearoa and the Pacific Islands. Science kits, which were developed with all the resources needed to do the practical activities and short instructional videos, were sent to seven schools in Tonga.

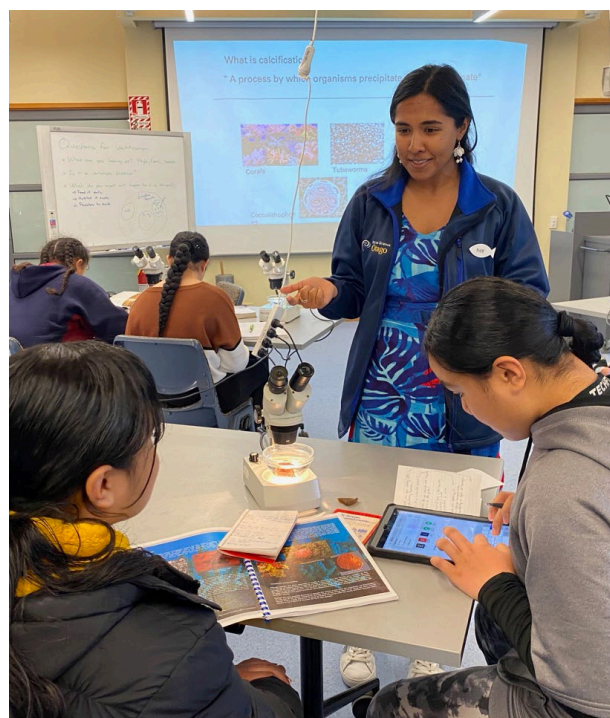


## Virtual Marine Metre Squared

Learn how to do a Marine Metre Squared survey from your home or classroom using Genially, and collect your own data through interactive images and videos. This resource was developed as part of the Hauraki Gulf Monitoring Project to continue engaging communities with MM2 throughout the Covid-19 restrictions..

Rocky Shore: <https://bit.ly/MM2Rocky>

Sandy Shore: <https://bit.ly/MM2Sandy>



# Citizen science projects

## Marine Metre Squared (Mm2) Citizen Science

This project encourages communities to get involved in long-term monitoring of the coastal environment. The development of protocols and collection of data over time allows communities to assess change in their local shoreline, and supports stewardship and restoration projects. This project helps to build a picture of the biodiversity, distribution and abundance of seashore animals and plants in Aotearoa's marine environment.

Mm2 now has more than 3,000 people registered and more than 2,200 surveys completed all over the country.

In 2021, five Mm2 workshops were run for schools and communities in Dunedin, with 70 students and 47 teachers and community participants.

[www.mm2.net.nz](http://www.mm2.net.nz)



## Hauraki Gulf Monitoring Project

The NZMSC has been leading the Hauraki Gulf Monitoring Project (HGMP) since 2019. The project, running since 2017, utilises Marine Metre Squared (Mm2) as a tool to gather information on seashore ecology and conduct long-term monitoring.

In 2021, the project continued the focus on identifying and locating invasive species from 2020, as well as looking at the wider health of the catchment. Awareness and kaitiakitanga (guardianship) were also a strong focus, with students encouraged to spread their knowledge of the Hauraki Gulf with the wider school community and their families.

Seven schools participated in 2021, with 567 people engaging with the programme (519 primary and secondary students, and 48 teachers). During the COVID-19 lockdown resources were developed to continue engaging with Auckland communities.

<https://www.mm2.net.nz/get-involved/hauraki-gulf-monitoring-project>



## Shark Spy Taranaki

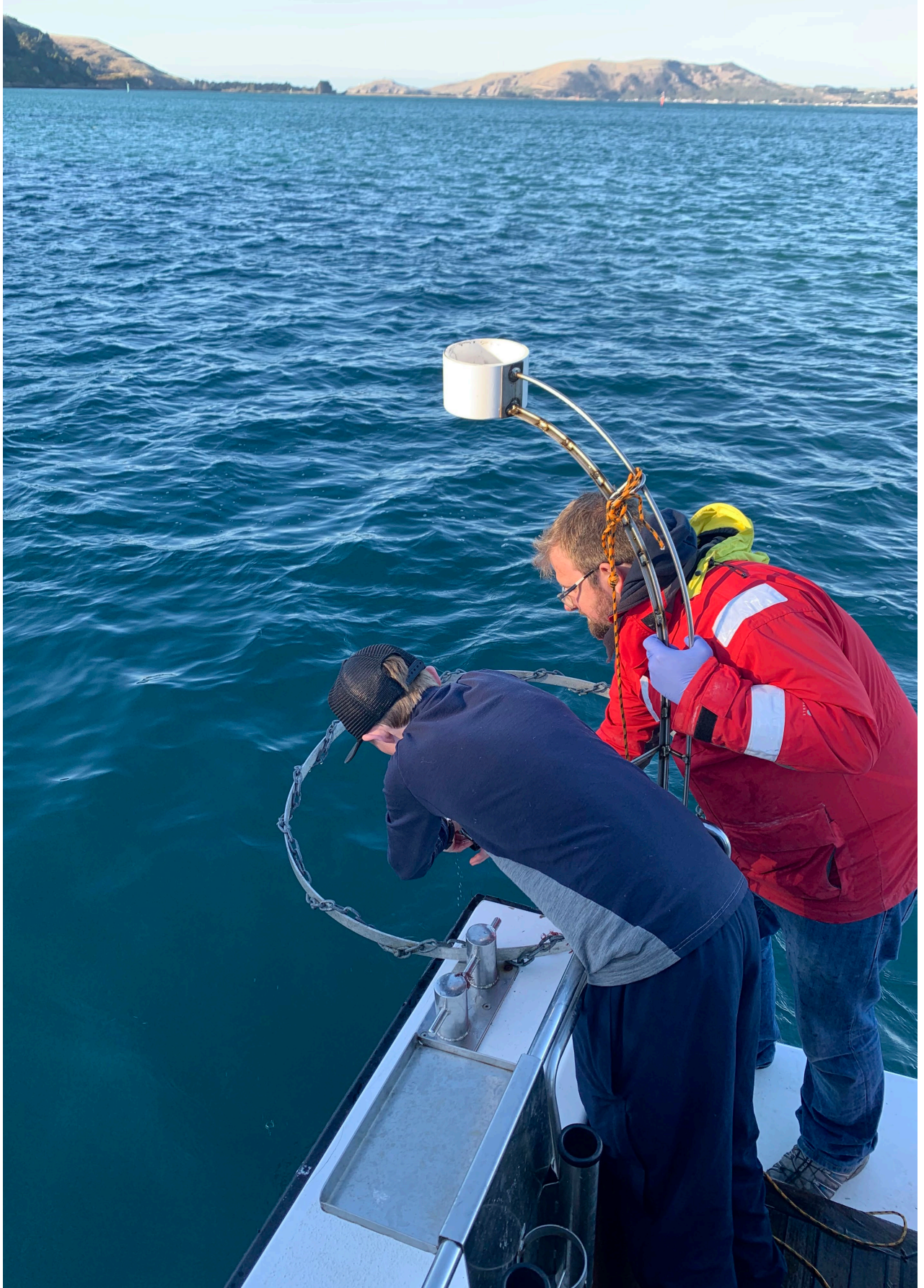
Shark Spy involved schools and communities in Otago and Taranaki. Throughout 2021, 368 students and 149 teachers and adults helped to collect shark data and add to a nationwide database. Findings from the project were published.\*

The project was more accessible from home or the classroom via a short video series on YouTube. Videos included meeting project co-ordinator Rob Lewis, taking a virtual sampling trip on the boat and finding out how to survey beaches for egg cases:

<https://www.otago.ac.nz/marine-studies/learning/citizen-science/index.html>

\* Lewis, Robert & Carson, Sally. (2021). Measuring Science Skills Development in New Zealand High School Students After Participation in Citizen Science Using a DEVISE Evaluation Scale. New Zealand Journal of Educational Studies. 56. 10.1007/s40841-021-00192-6.







# 2021 Community programme

## “Taking steps together for our future ocean”

The 2021 Community Programme Footprints in the Sand, powered by Westpac, focused on fostering connections between people and the local coast, while learning about sustainability and how to care for the environment. The programme was launched in March with the Dunedin Westpac branch in association with a Marine Metre Squared Coastal Care Workshop.

The Programme involved 30 events that were enjoyed by more than 674 participants (249 children and 425 adults).

Most attendees (91%) increased their appreciation for the marine environment. More than 70% increased their understanding of issues affecting the marine environment and wanted to be more active in coastal care.



The Footprints in the Sand 2021 Programme is powered by Westpac





## Marine Encounter Tours

Through hands-on encounters with the local wildlife and a tour of the research facilities at Portobello, participants develop a connection to the coast, learn how the marine environment is changing and leave understanding how they can better care for the local coastline.

## Wet and Wild Walks

Our wet and wild walks were virtual this year, allowing them to reach people all over Aotearoa! We hosted two walks along the rocky shore focused on learning how to identify species, their te reo Māori names and what challenges these intertidal animals face.

## Eyes Underwater

It's never been easier to dive into the Otago Harbour than with the Eyes Underwater livestreams! From the comfort of home, school or work, people tuned in to dives off the Otago coast with a remote operated vehicle. During three separate dives we explored the biodiversity of the coast, learned how animals survive in areas adapted for human living and shared ways people can look after coastal areas. Livestreaming allowed us to reach an even wider audience, with schools from Auckland engaged during lockdown and people from overseas joining in.

People expressed their appreciation in the comments during our livestream:

“ Loving it. I did my masters in Marine Bio many many years ago, this is fun getting some info with a live feed. ”

“ This was fun and super fascinating! Thanks for the livestream, all the info and links. Looking forward to the next ones! ”

## Coastal Care Workshops

Six workshops explored issues around climate change, biodiversity and sustainability, providing participants with actions to support conservation and research initiatives.

Participants interpreted climate change data into art and helped to create a calendar that communicated science data in more accessible ways.

Two photography workshops engaged local photographers and enthusiasts on the rocky shore, to practice marine photography skills and learn how photography can contribute to citizen science using the iNaturalist app.

People also contributed to the national beach clean up project “Litter Intelligence”, spied on sharks underwater with “Shark Spy” to record local biodiversity and contributed to the long-term Marine Metre Squared dataset.

“ Never been to the centre before, learned how to take better photographs. Good to hear people prioritise the wildlife over the photo. ”

## Snippets from the Sea

This seminar series was held at the NZ Marine Studies Centre. These free sessions were popular, with our first seminar attracting 70 people. Sessions were hosted on “Seabird Science” and “Seaweed Secrets”, with experts sharing current research, like bull kelp hitchhikers and seaweed drift, and the family relationships and friendships of kororā, the little blue penguin! Kōrero over tea, coffee and snacks meant that the public got to chat one-on-one with experts and build connections with a community of like-minded enthusiastic people.

“ Firstly the location was stellar, being able to visit the Marine Studies Centre was a privilege itself. Secondly it was very interesting to have experts passionately explain issues in layman's terms. As someone with no background in science and no peers with deep ties either it is hard to know what work is being done (at least locally) to address the environmental issues we face. ”





Full details of the school programmes we offer, public events and projects we organise, and the free resources available to teachers and educators, can be found on our website.

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